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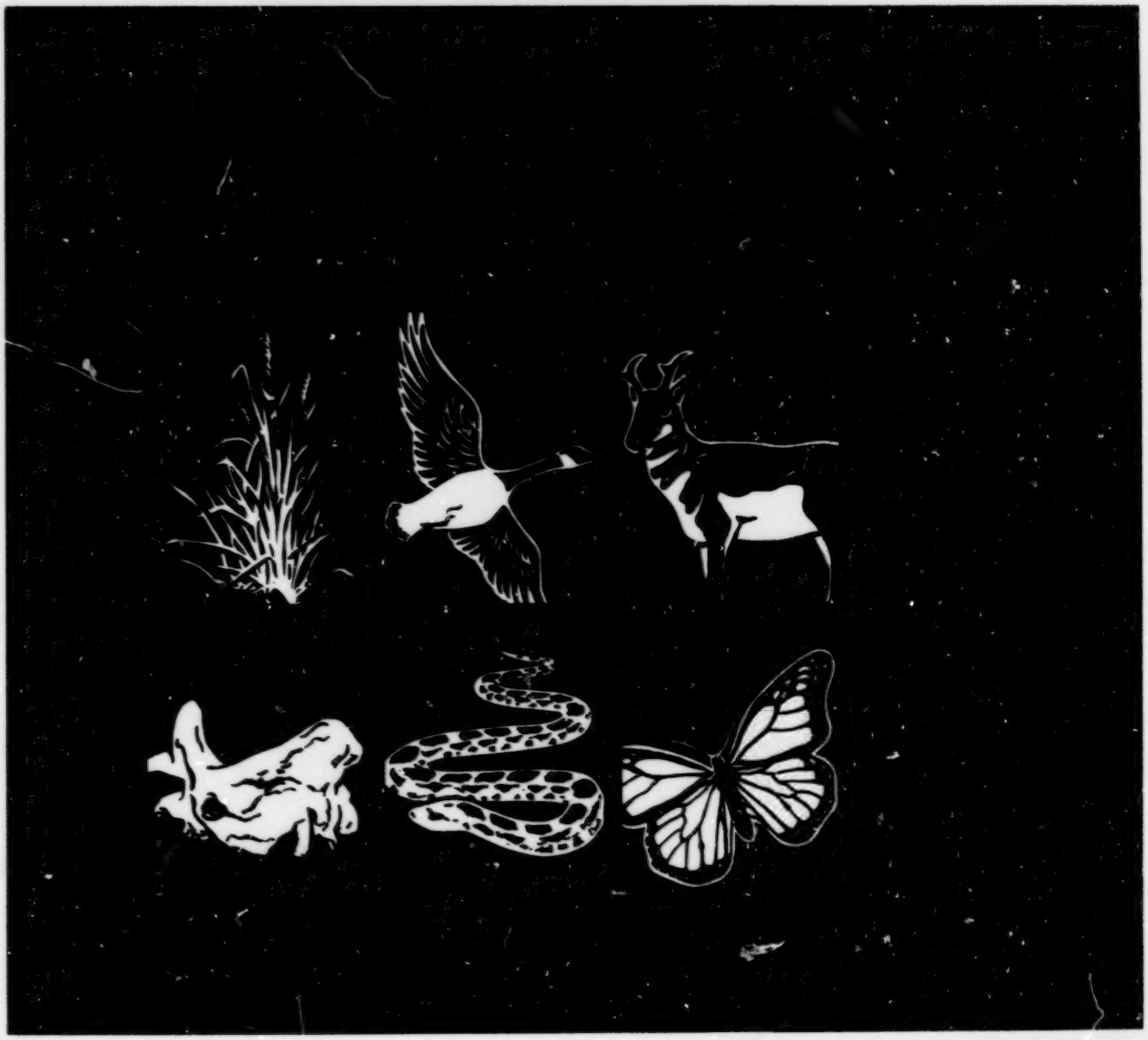
A Survey of Their Geographic Distribution



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Bumble Bees of Saskatchewan (Hymenoptera: Apidae): A Survey of Their Geographic Distribution.

by Philip S. Curry

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A Survey of Their Geographic Distribution

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ABSTRACT

The survey recorded 17 species of *Bombus* and four species of *Psithyrus* in Saskatchewan. Notes on the geographical distribution of the species and keys to the identification of *Bombus* queens and *Psithyrus* females are included.

INTRODUCTION

Bumble bees are widely distributed in the northern hemisphere and some live as far north as Ellesmere Island in Canada's arctic. The density and diversity of species is especially high in the north temperate zone. North America has about 50 species, and 21 have been recorded from Saskatchewan. These are in two genera - *Bombus*, the true bumble bees, and *Psithyrus*, the parasitic bumble bees. Most bumble bee species have relatively wide distributions. Some are found from the east to the west coast and across several ecological regions. In Saskatchewan a high diversity of species occurs in the southern boreal forest region and forest-grassland transition zone and few species exist on the prairie.

Details on the biology, habits and distribution have been outlined by several authors: Neave (1933), Hobbs (1964, 1965a, 1965b, 1966a, 1966b, 1967, 1968), Milliron (1971, 1972, 1973), and Richards (1973, 1978). The mated queen emerges from hibernation from early spring to early summer, depending on the species. Following a brief period of ovarian development the queen seeks for a suitable place to establish a colony. The queens are often seen flying low over undisturbed ground along shelter belts, hedges or untended areas while searching for a nest

site. The usual nest sites in Saskatchewan are abandoned nests of birds, mice or other rodents, and these consist of an accumulation of grass, moss or leaves.

After selecting her site the queen forms a hollow in the center of the nesting material, builds a wax cup in which she lays eggs, and incubates them until they hatch. The queen also forages for nectar and pollen to feed herself and her developing larvae. After about ten days the larvae spin their cocoons and pupate.

The development of egg to adult bee takes three to four weeks depending on temperature and food supply. The size of the workers depends on the amount of food they receive in the larval stage. Ordinarily, the first workers are smaller than those produced later. This is the result of the queen collecting all the food herself and that the abundance of spring flowers may be in short supply.

Depending on the species and environmental factors during development, from 10 to 400 bees may be produced in a single season; colonies of 30 to 100 bees are common for Saskatchewan. Male bees and new queens are produced in late summer when the colony reaches its largest size. Males are produced from unfertilized eggs and queens, like workers, are produced from fertilized ones. Externally, queens look like large workers. Males leave the colony when they are a few days old and seldom return, but young queens remain close to the nest. Mating takes place away from the colony, and a queen may mate several times. Early in the fall, the newly fertilized queens enter hibernation. Most bury themselves a few centimeters beneath the soil or beneath leaves or other debris.

The parasitic bumble bees of the genus *Psithyrus* differ from the *Bombus* in that they are not social, do not produce worker bees, and the

females do not collect pollen and nectar for feeding their brood. The mated females emerge from hibernation a few weeks later than their host bee species. The *Psithyrus* female finds a *Bombus* colony by its scent, and enters the nest so that the workers are not alarmed. She may force out or kill the resident queen immediately or after several weeks of cohabitation (Hobbs et al, 1962).

The workers accept the *Psithyrus* as their new queen and she begins her task of egg-laying. *Psithyrus* females produce no workers of their own and the feeding and caring for the new larvae as well as foraging and nest-building activities is assumed by the *Bombus* workers. The future size and strength of the colony is dependent on the number of *Bombus* workers present when the *Psithyrus* female enters the nest.

In 1980 the Entomological Society of Saskatchewan encouraged the distribution mapping of insect orders and families throughout Saskatchewan. Thus a study of distribution of bumble bees found in Saskatchewan was instigated on behalf of the society.

METHODS

The task of mapping the distribution was made possible by the co-operation of amateur naturalists, biologists and professional entomologists who acted as collectors and resource personnel. Specimens collected and submitted were identified to species by several entomologists who were competent in bumble bee taxonomy. Individuals with access to museum collections and libraries also sent in material and records from past literature.

The base maps were produced by the Entomological Society of Saskatchewan using a 73 x 113 km grid square system. One symbol was used: a blackspot representing species records from one or several localities within a particular square in the grid.

The number of records received in the survey exceeded expectations and were distributed over the entire province. Few records were obtained from northern Saskatchewan and for the less common species.

GEOGRAPHIC DISTRIBUTION

Saskatchewan may be divided into three native vegetation regions, the lines of division running roughly from southeast to northwest (fig. 1). The southernmost area is prairie and is characterized by a vegetation cover of low grasses in the south (*Bouteloua-Agrostis-Stipa*) and intermediate grass mixes to the north (*Agropyron-Bromus-Festuca*). The second region, the boreal-grassland transition is characterized by a grassland cover (*Poa-Festuca*) interspersed with groves of *Populus* or *Salix*. About two-thirds of the province is in the boreal forest region where the dominant vegetation consists of *Pinus*, *Populus* and *Picea* along the southern sections of the region and *Picea* and *Abies* to the north.

The distribution records of bumble bee species obtained in this survey indicate that some species are restricted to either the boreal forest or grassland regions, while others are generally distributed. *B. fervidus*, *B. nevadensis*, *B. huntii* and *B. borealis* commonly occur in the grassland area and are occasionally encountered along the southern edge of the boreal grassland transition zone. *B. occidentalis* is also restricted to the grassland, but is not as common. Two common grassland species, *B. ternarius* and *B. rufocinctus* have ranges which extend into the boreal-grassland transition and southern boreal forest regions.

Several species appear to be confined to relatively narrow ranges in Saskatchewan, usually along the boreal-grassland transition zone and along the southern edge of the boreal forest zone. This phenomenon

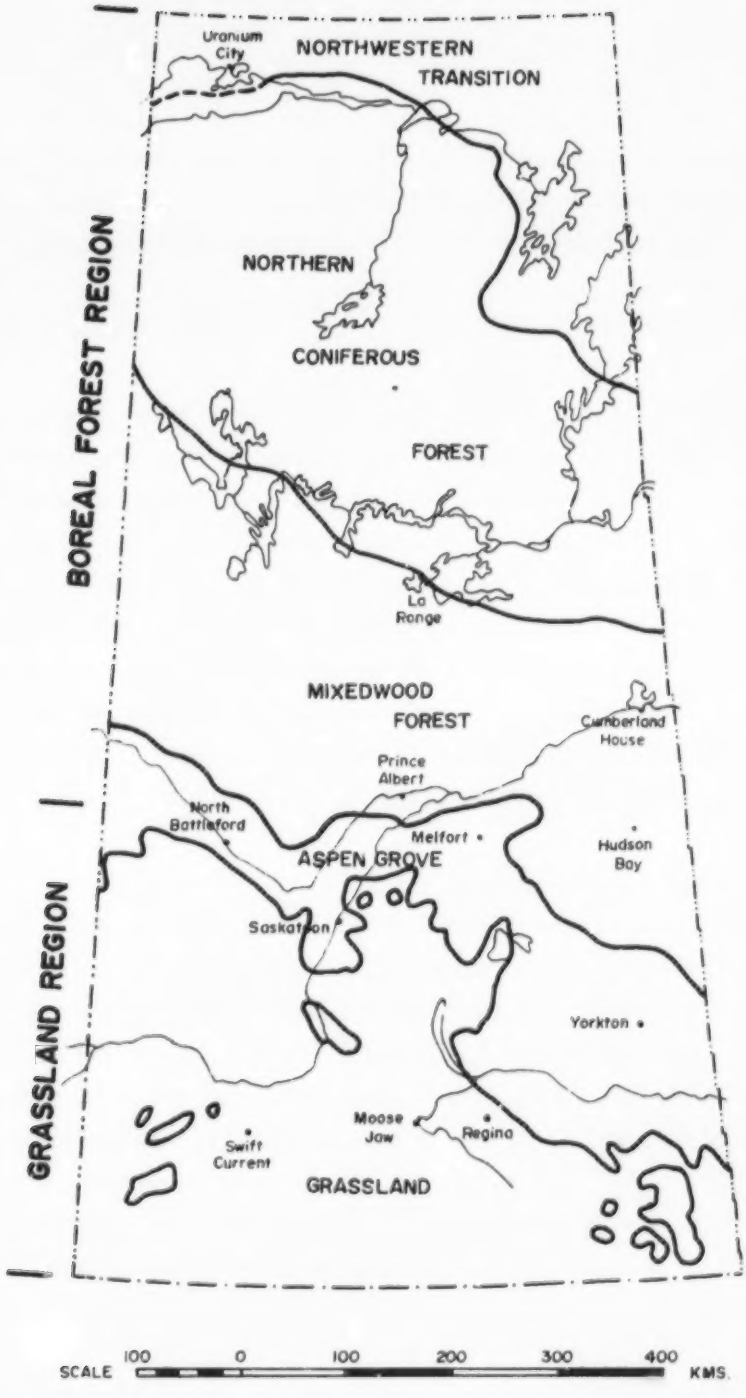

Fig. 1. Vegetation Zones of Saskatchewan (Rowe, 1972).

occurs even though some species, such as *B. vagans*, have a wide longitudinal distribution, ranging from the east to the west coast in Canada (Krombein et al, 1979). *B. perplexus* is included in this group as it appears to reach its western limits in Saskatchewan. It is common in eastern Canada but has rarely been recorded in Alberta (Hobbs, 1967). Other species confined to the southern boreal forest or boreal-grassland transition areas include *B. appositus* and *B. californicus*.

Three species recorded in Saskatchewan are confined entirely to the boreal forest region. *B. frigidus* is widespread in the boreal forest area. The ranges of *B. mixtus* and *B. melanopygus* are somewhat narrower. *B. melanopygus* is more common in the northern coniferous forest areas while *B. mixtus* is not found as far north or as far south as *B. melanopygus* or *B. frigidus*.

The survey data indicate that the greatest number of species occurs in the boreal-grassland transition zone and the southern edge of the boreal forest zone (the mixed-wood forest). Less collecting has been done in the boreal forest zone than farther south. Many species are found in at least two areas. Only one species, *B. terricola*, occurs throughout Saskatchewan. The ranges of the *Psithyrus* species are probably as co-extensive as their hosts. Thus *P. ashtoni*, *P. suckleyi* and *P. insularis* occur in the grassland and boreal-grassland transition zones. *P. fernaldae*, parasitic on several woodland *Bombus* species, appears to be confined to more northerly areas.

CLASSIFICATION

The identification of many species of bumble bees is a difficult task. This is due, in large part, to the colour variation that exists within many species.

The following keys, which emphasize colour pattern, aid the identification of the twenty-one species of *Bombus* and *Psithyrus* in Saskatchewan. Some species, such as *B. rufocinctus*, have extreme colour variation among individuals even from the same colony. Other species (*B. borealis* and *B. appositus*) have similar (and relatively constant) colour patterns.

The keys deal only with *Bombus* queens and workers and *Psithyrus* females. Except for the usual difference in size, *Bombus* queens and workers (all females) are similar. Although females of *Psithyrus* and *Bombus* can be identified easily, the males are more difficult to distinguish. Males of both genera have longer antennae (13-segments) and larger eyes than females. They also do not possess a stinger and tend to be more hairy than females.

The terminology follows Franklin (1912), Milliron (1940), and Stephen (1957). Figure 2 illustrates some of the characteristics used in the keys and the glossary on page 44 provides definitions of some structural parts.

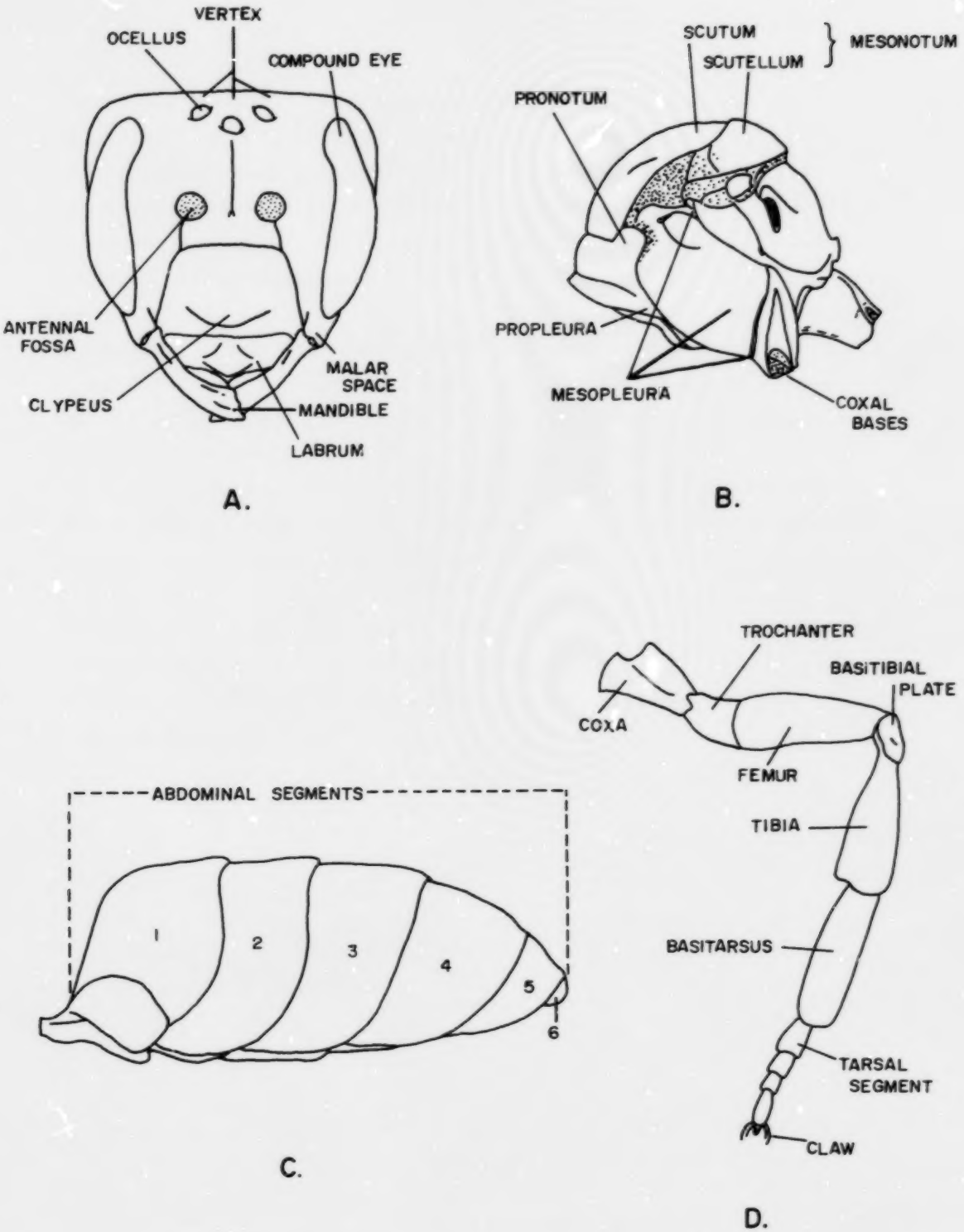

Figure 2. *Bombus* queen. A, Facial view of head; B, Lateral view of thorax; C, Lateral view of abdomen; D, Hind leg.

KEY TO THE GENERA

1. Hind tibiae concave or flat, smooth, fringed with long hairs forming a pollen basket
..... *Bombus*
Hind tibiae convex, hairy, lacking a developed pollen basket; overall appearance less hairy than *Bombus*
..... *Psithyrus*

KEY TO THE SPECIES OF *BOMBUS* QUEENS AND WORKERS

1. Mesonotum with no distinct interalar black band 2
Mesonotum with distinct interalar black band 10

2. Mesonotum entirely, or almost entirely, covered with yellow pile, at most only a small black patch of black pile present 3
Mesonotum with a large amount of black pile between the bases of the wings 5

3. First abdominal segment usually tawny yellow; second and third entirely yellow; remainder black; dorsum of thorax with yellow pile except for a small bare spot in the middle (large species)
..... *nevadensis*
All dorsal abdominal segments beyond the second entirely covered with black pile, the remainder yellow 4

4. Malar space not longer than its apical width; yellow of pleura not extending to leg bases..... *perplexus*
Malar space always noticeably longer than its apical width, giving the head a long appearance; yellow of pleura extending to leg bases
..... *vagans*

5. Malar space longer than its apical width; first to third abdominal segments black, fifth and sixth black, yellow at apex of fourth ..... *californicus*
Malar space not longer than its apical width 6

6. Pleura black; vertex of head and face mostly black; first abdominal segment black 7
Pleura covered with yellow pile; vertex of head and/or face with yellow pile; first abdominal segment yellow or tawny yellow 8

7. Last abdominal segments with white pile; vertex of head and face mostly black but with some yellow near bases of antennae ..... *occidentalis*
Last abdominal segments without white pile; vertex of head and face entirely black ..... *terricola*

8. Third abdominal segment black, the remainder yellow or cloudy yellow; anterior of mesonotum cloudy yellow ..... *mixtus*
Some abdominal segments with pale red or reddish-brown hairs 9

9. Mesonotum and vertex of head with black and yellow pile mixed, giving a clouded effect; first abdominal segment yellow, second and third pale red, remainder black ..... *melanopygus*
Mesonotum with black and yellow pile separate, the black may form an indistinct band extending to wing bases; first abdominal segment tawny yellow, second and third with orange-red, reddish-brown, or black hairs, fourth tawny yellow sometimes mixed with black, remainder black (variable colour patterns) ..... *rufocinctus*

10. Malar space with medium length longer than apical width 11
    Malar space with medium length equal to and/or shorter than apical width 14

11. Third and fourth abdominal segments with reddish-orange pile ..... *centralis*
    First to fourth abdominal segments entirely yellow or tawny yellow 12

12. Vertex of head and face mostly black ..... *fervidus*
    Vertex of head and face mostly yellow or light-coloured 13

13. Vertex of head yellow, face white; thorax and first four abdominal segments tawny yellow ..... *borealis*
    Anterior of thorax white or light yellow; first five abdominal segments tawny yellow ..... *appositus*

14. First and fourth abdominal segments largely yellow; second and third abdominal segments variously coloured from reddish-orange to black 15
    First and second abdominal segments yellow; third segment black 18

15. Vertex of head and face mostly black; interalar band wide with posterior margin forming a 'V' on the mesonotum ..... *ternarius*
    Vertex of head mostly yellow with black on face; yellow of pleura not extending to bases of legs..... 16

16. Face mostly black with only a few pale hairs near bases of antennae; second and third abdominal segments with variable colour pattern (orange-red to entirely black) ..... *rufocinctus*
Face with white to yellow pile surrounding bases of antennae; second and third abdominal segments variously coloured from reddish-orange to black 17

17. First and fourth abdominal segments yellow, fifth and sixth black, second and third variously coloured from reddish-orange to black; corbicular fringe of hairs pale ..... *bifarius*
Second and third abdominal segments always reddish-orange; corbicular fringe of hairs black ..... *huntii*

18. Interalar band fairly well-defined; anterior of mesonotum clearly yellow, not a cloudy mixture of yellow and black pile; first and second abdominal segments yellow, third black, apices of fourth, fifth and sixth yellow often mixed with reddish-brown hairs ..... *frigidus*
Anterior of mesonotum a cloudy mixture of yellow and black pile; abdominal segments as above but not as mixed with reddish-brown hairs; abdomen having a hairy, clouded appearance (small species) ..... *mixtus*

KEY TO THE SPECIES OF *PSITHYRUS* FEMALES

1. Tip of abdomen strongly pointed and recurved; interalar black band large, not well-defined; fourth abdominal segment and occasionally sides of first and third yellow, remainder dark; fifth sometimes with reddish-brown sides (small species) ..... *fernaldae*
   Tip of abdomen moderately pointed and recurved; fifth abdominal segment never with reddish-brown pile 2

2. Vertex of head largely yellow; interalar black band distinct ..... *insularis*
   Vertex of head black, rarely with admixture of yellow 3

3. Vertex of head black; yellow of pleura not extending to bases of legs; fourth abdominal segment and frequently sides of third and fifth yellow, remainder dark (small species) ..... *ashtoni*
   Vertex of head largely black sometimes with a slight admixture of yellow; sides of fourth abdominal segment yellow, remainder dark (large species) ..... *suckleyi*

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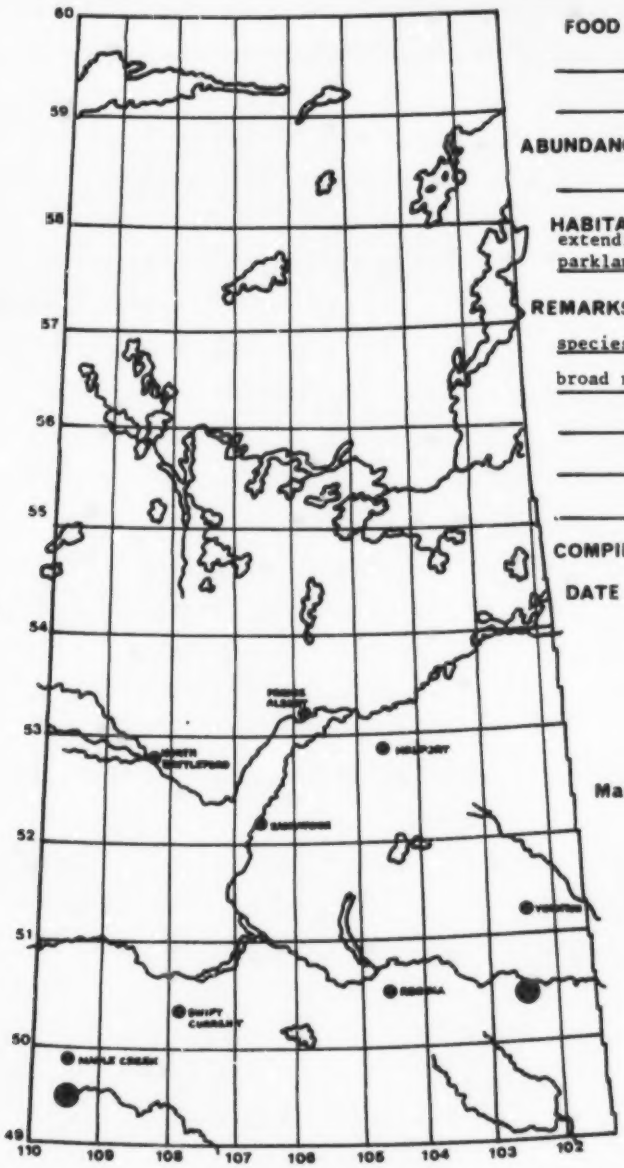
APPENDIX A. DISTRIBUTION MAPS

The following sets of maps illustrate the distribution of *Bombus* and *Psithyrus* species in Saskatchewan. Information on abundance, habitat and nesting preference for each species accompany the maps.

SPECIES *Bombus appositus* Cresson

COMMON NAME _____

SYNONOMY _____



FOOD _____

ABUNDANCE Rare

HABITAT Mixed prairie extending to aspen parkland areas

REMARKS An adaptable species which nest in a broad range of habitats.

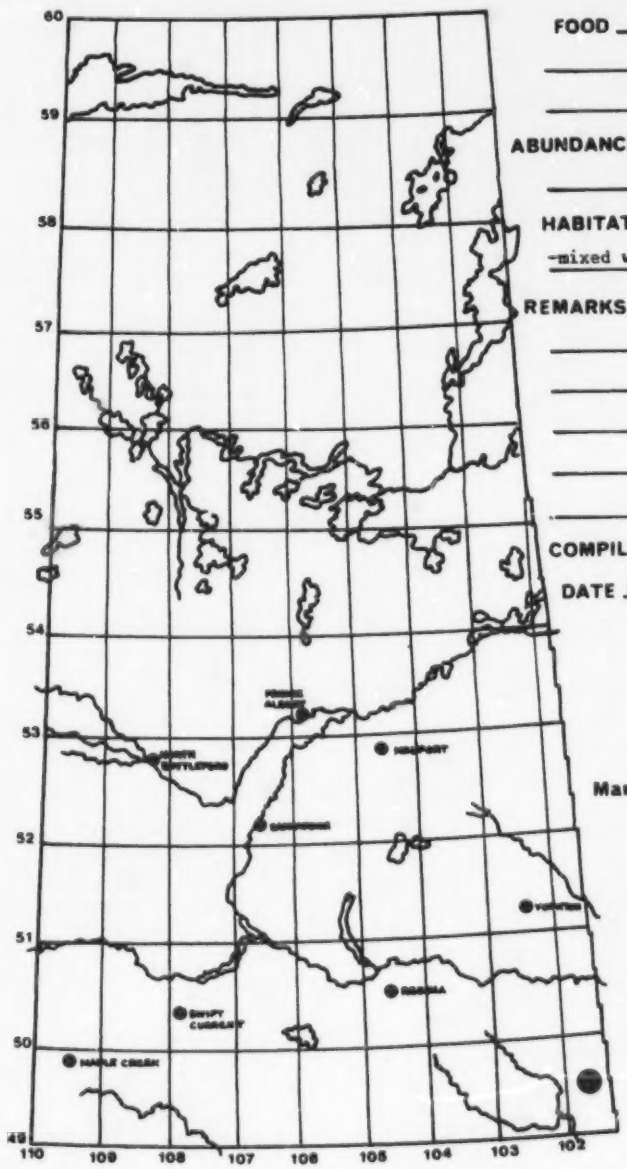
COMPILER P. Curry

DATE October, 1982

SPECIES *Bombus bifarius* Cresson

COMMON NAME

SYNONOMY



FOOD

ABUNDANCE Rare

HABITAT Aspen parkland -mixed wood forest

REMARKS

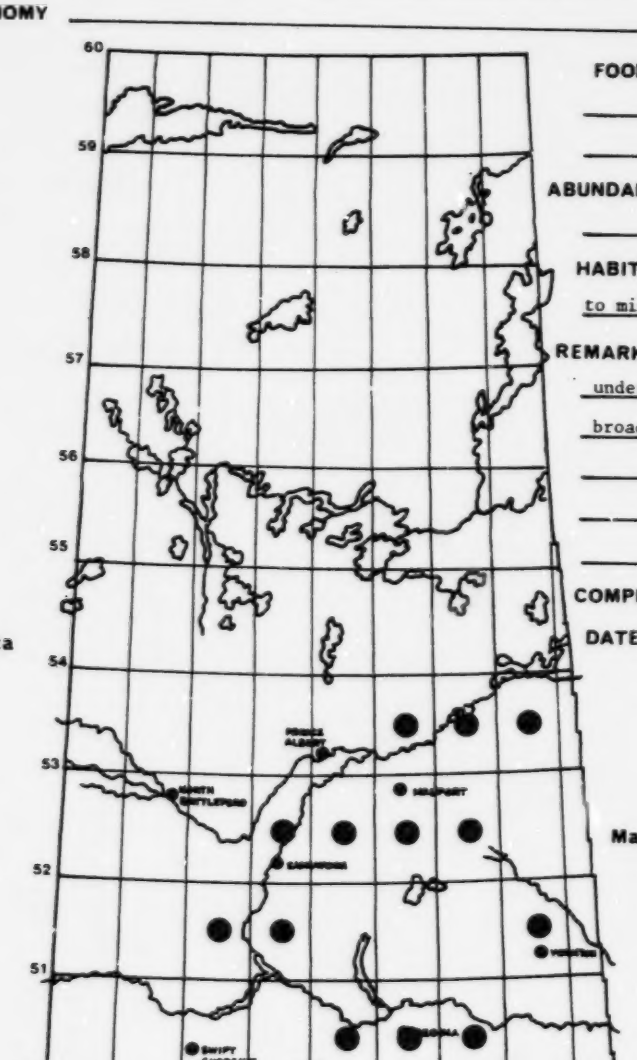
COMPILER P. Curry

DATE October, 1982

SPECIES *Bombus borealis* Kirby

COMMON NAME

SYNONOMY



FOOD

ABUNDANCE Regular

HABITAT Mixed prairie to mixed wood forest

REMARKS Nests underground and surface broad nesting range.

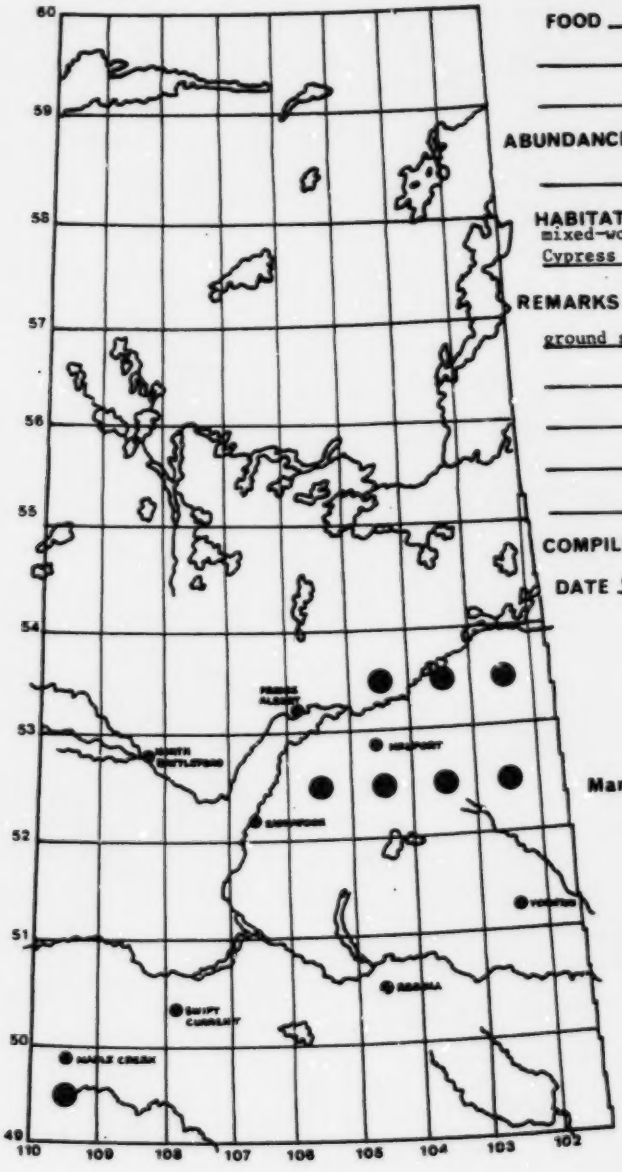
COMPILER P. Curry

DATE October, 1982

SPECIES *Bombus californicus* Smith

COMMON NAME

SYNONOMY



FOOD

ABUNDANCE Occasional

HABITAT Aspen parkland, mixed-wood forest (also Cypress Hills)

REMARKS Nests on ground surface

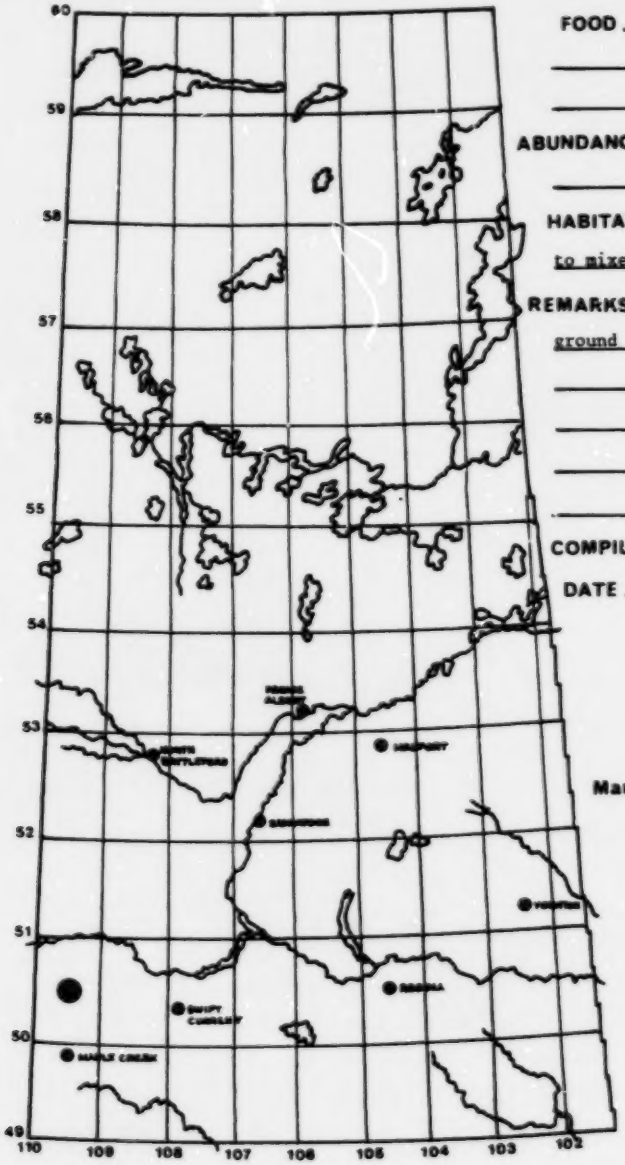
COMPILER P. Curry

DATE October, 1982

SPECIES *Bombus centralis* Cresson

COMMON NAME

SYNONOMY



FOOD

ABUNDANCE Rare

HABITAT Mixed prairie to mixed wood forest area

REMARKS Nests on ground surface

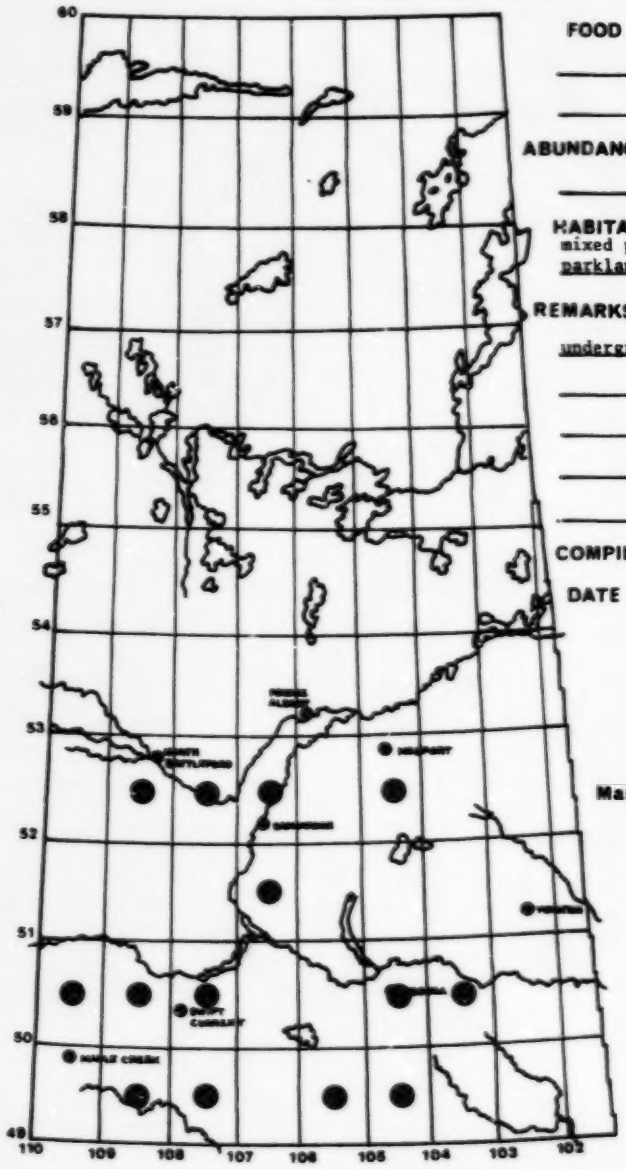
COMPILER P. Curry

DATE October, 1982

SPECIES *Bombus fervidus* Fabricus

COMMON NAME _____

SYNONOMY _____



FOOD _____

ABUNDANCE Regular

HABITAT Short grass and mixed prairie to aspen parkland

REMARKS Nests underground

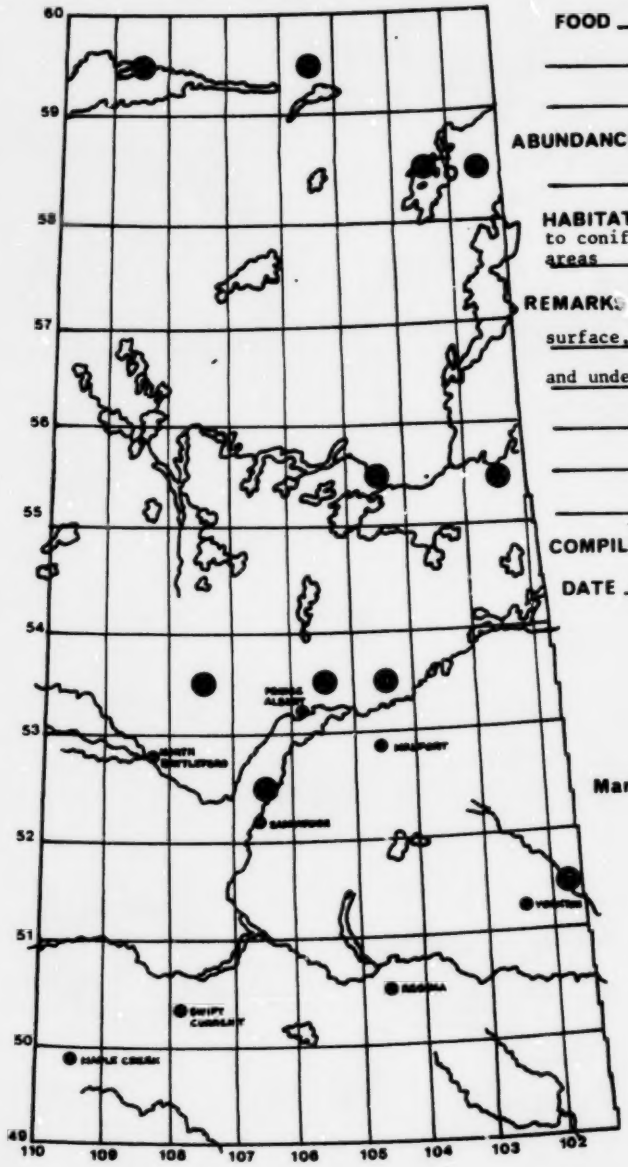
COMPILER P. Curry

DATE October, 1982

SPECIES *Bombus frigidus* Smith

COMMON NAME

SYNONOMY



FOOD

ABUNDANCE Occasional

HABITAT Aspen parkland to coniferous forest areas

REMARKS Nests on ground surface, above ground and underground

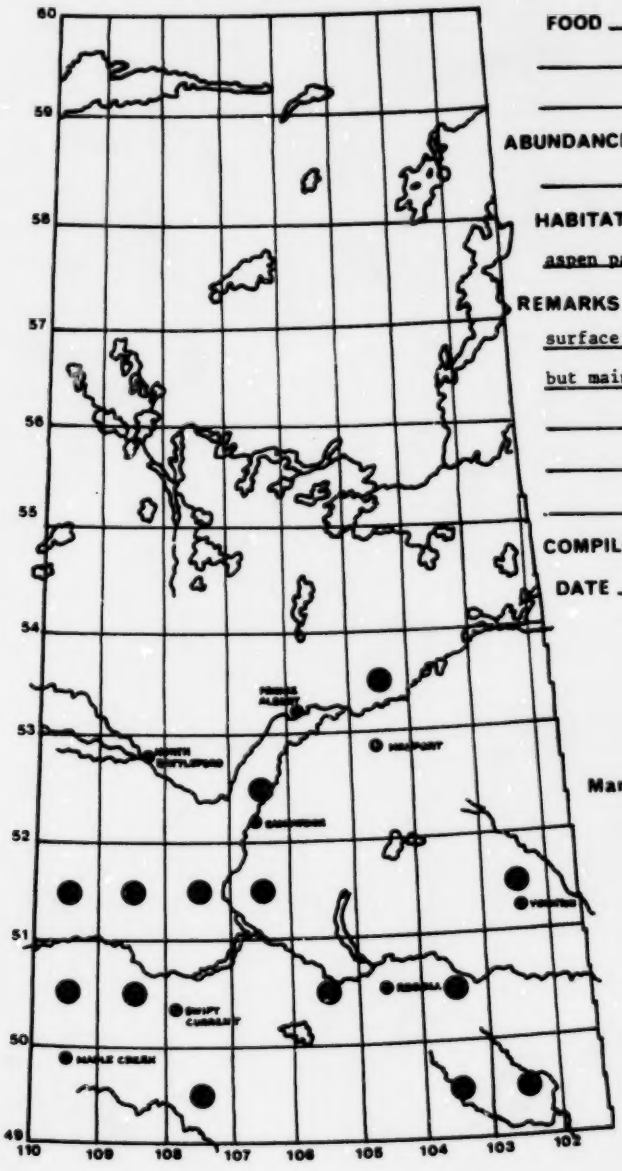
COMPILER P. Curry

DATE October, 1982

SPECIES *Bombus huntii* Greene

COMMON NAME

SYNONOMY



FOOD

ABUNDANCE Common

HABITAT Prairie to aspen parkland.

REMARKS Nests on the surface or underground but mainly underground

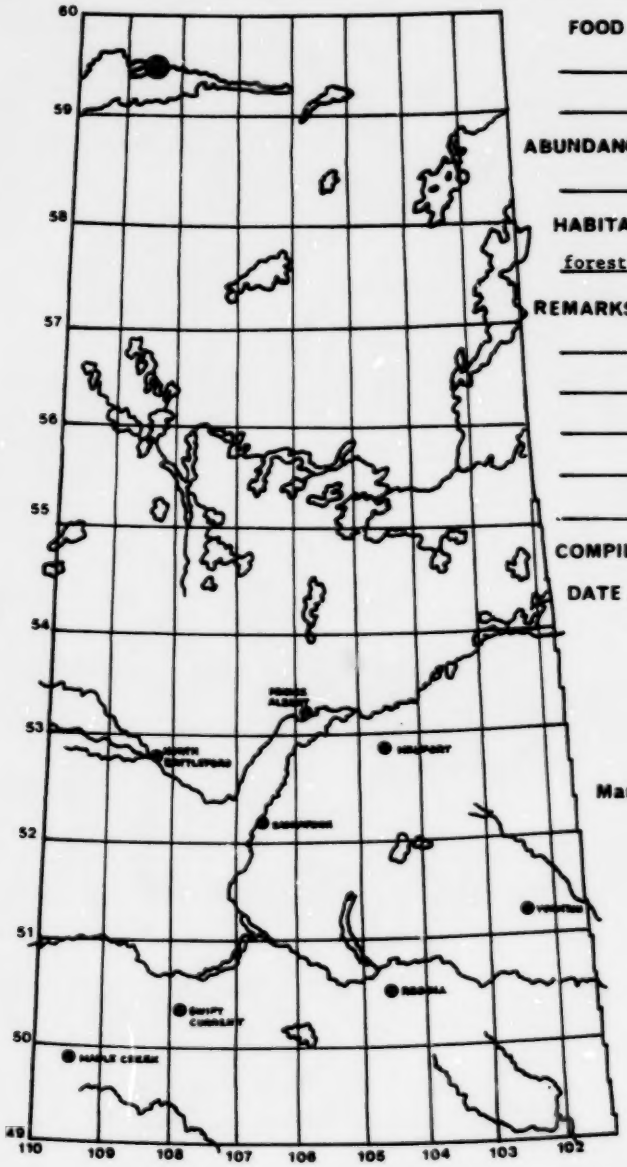
COMPILER P. Curry

DATE October, 1982

SPECIES *Bombus melanopygus* Nylander

COMMON NAME

SYNONOMY



FOOD

ABUNDANCE Occasional

HABITAT Coniferous forest.

REMARKS Nests on surface

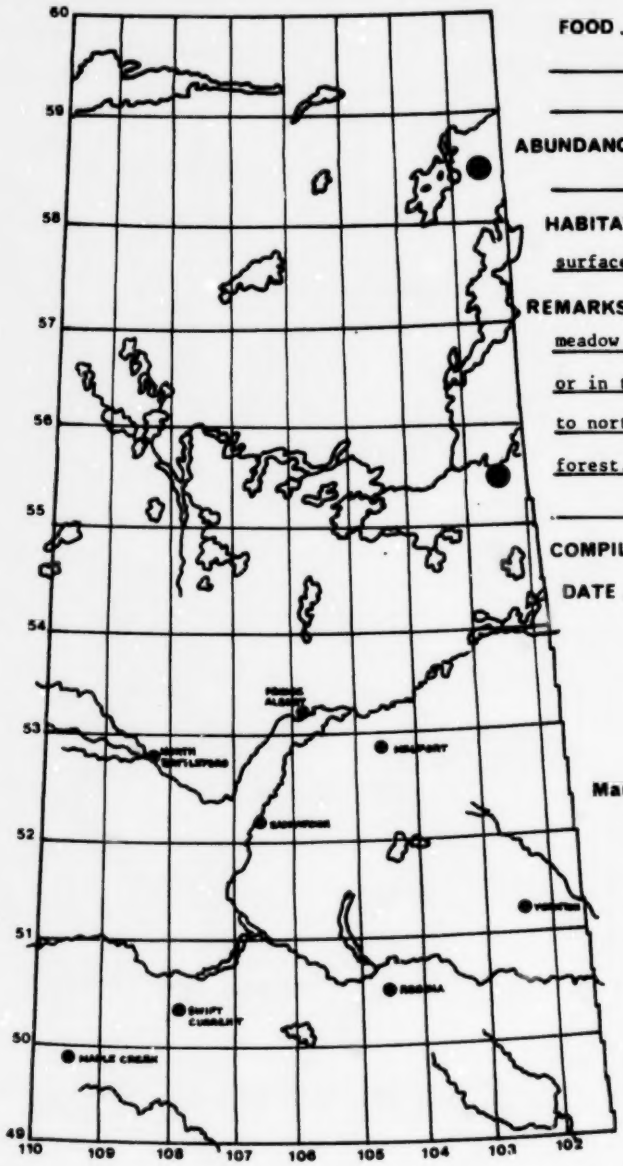
COMPILER P. Curry

DATE October, 1982

SPECIES *Bombus mixtus* Cresson

COMMON NAME

SYNONOMY



FOOD

ABUNDANCE Occasional

HABITAT Nest on the surface or above ground,

REMARKS not in open meadow but tree interface or in trees. Mixed-wood to northern coniferous forest.

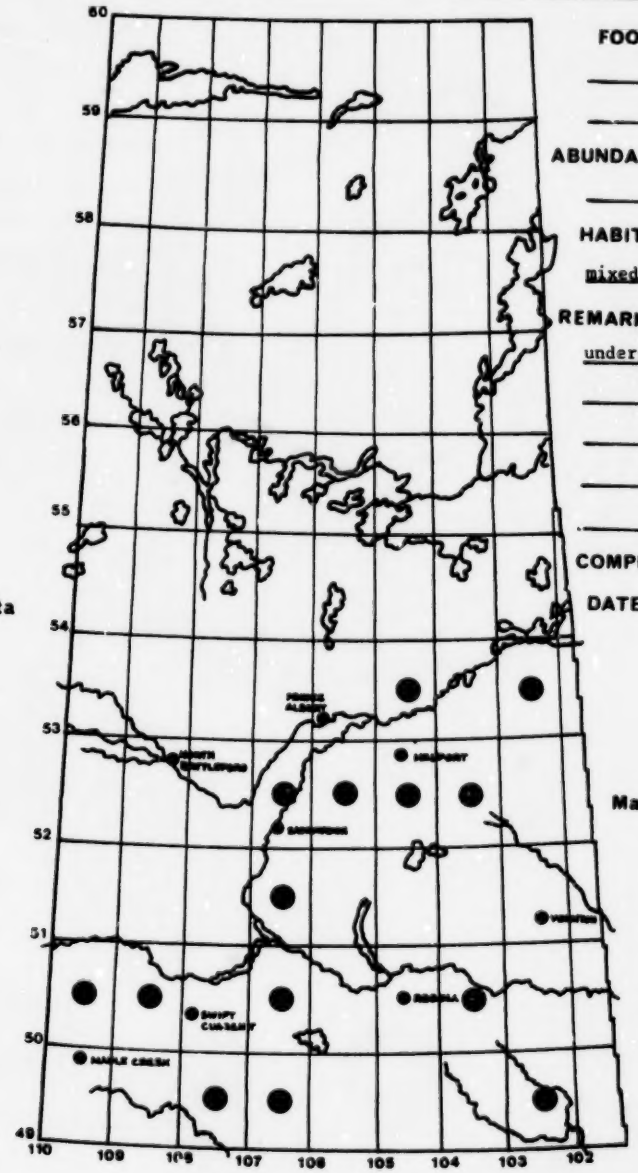
COMPILER P. Curry

DATE October, 1982

SPECIES *Bombus nevadensis* Cresson

COMMON NAME

SYNONOMY



FOOD

ABUNDANCE Regular

HABITAT Prairie to mixed wood forest

REMARKS Nests underground

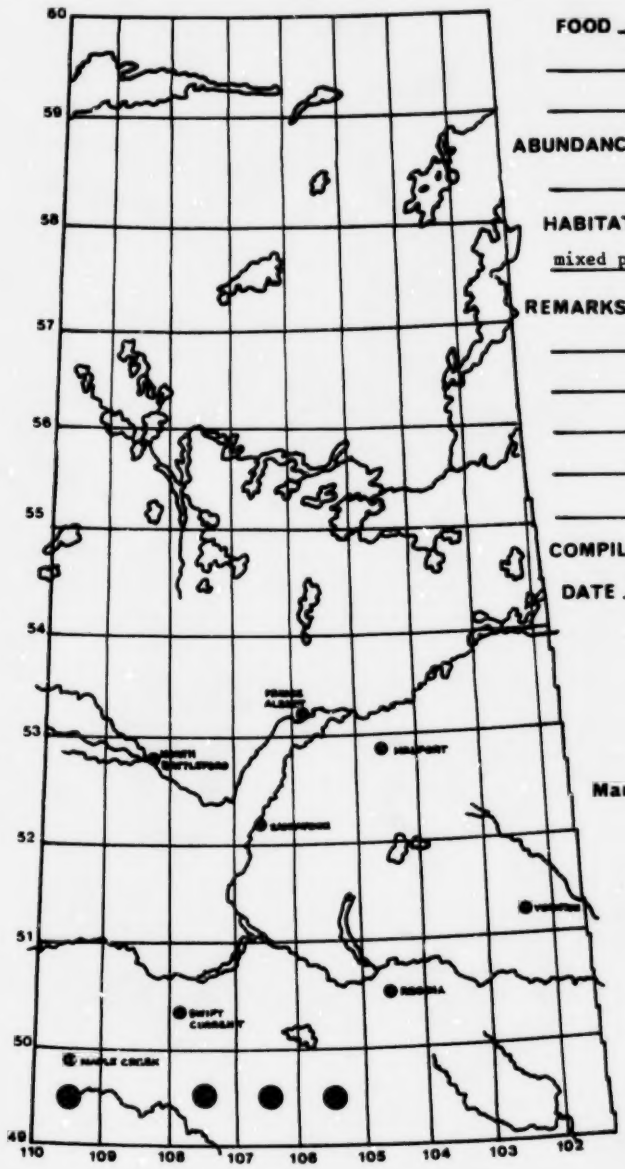
COMPILER P. Curry

DATE October, 1982

SPECIES *Bombus occidentalis* Greene

COMMON NAME

SYNONOMY



FOOD

ABUNDANCE Occasional

HABITAT Short grass to mixed prairie

REMARKS Nests underground

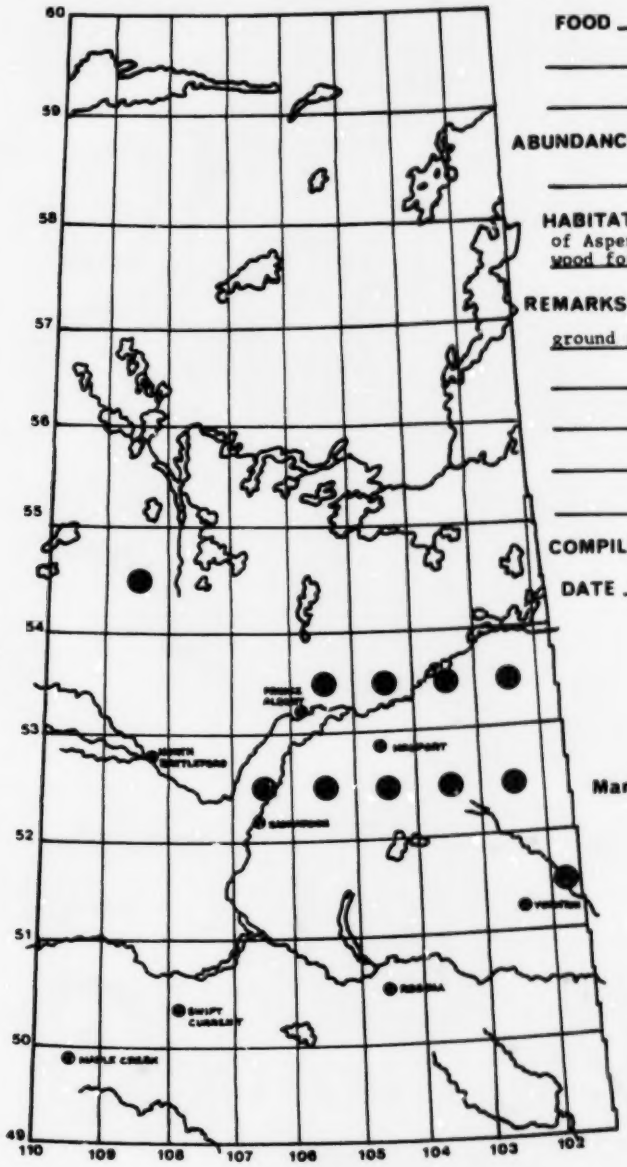
COMPILER P. Curry

DATE October, 1982

SPECIES *Bombus perplexus* Cresson

COMMON NAME

SYNONOMY



FOOD

ABUNDANCE Regular

HABITAT Eastern section of Aspen parkland mixed wood forest

REMARKS Nests on ground surface

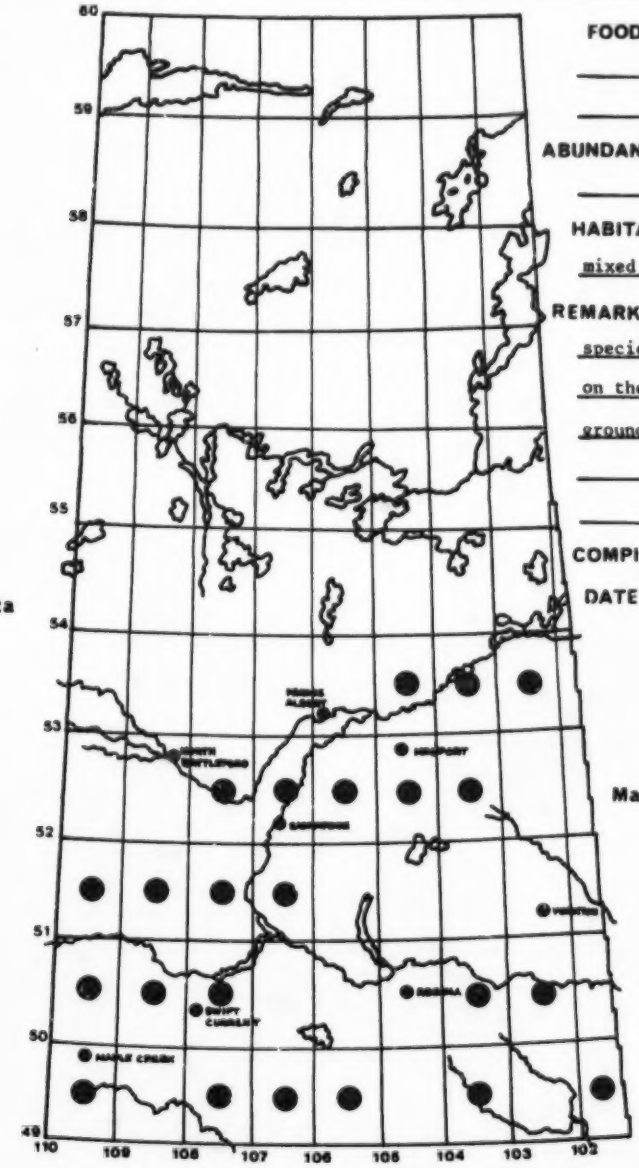
COMPILER P. Curry

DATE October, 1982

SPECIES *Bombus rufocinctus* Cresson

COMMON NAME

SYNONOMY



FOOD

ABUNDANCE Common

HABITAT Prairie to mixed wood forest areas

REMARKS An adaptable species which can nest on the surface or underground or above ground

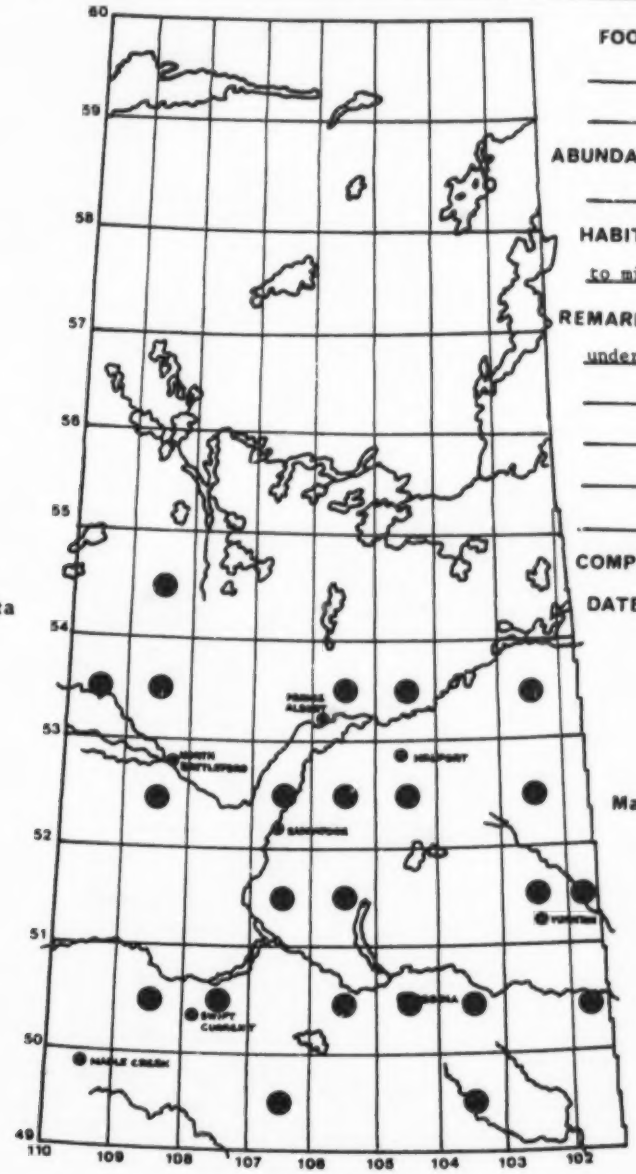
COMPILER P. Curry

DATE October, 1982

SPECIES *Bombus ternarius* Say

COMMON NAME

SYNONOMY



FOOD

ABUNDANCE Common

HABITAT Mixed prairie to mixed-wood forest area

REMARKS Nests underground

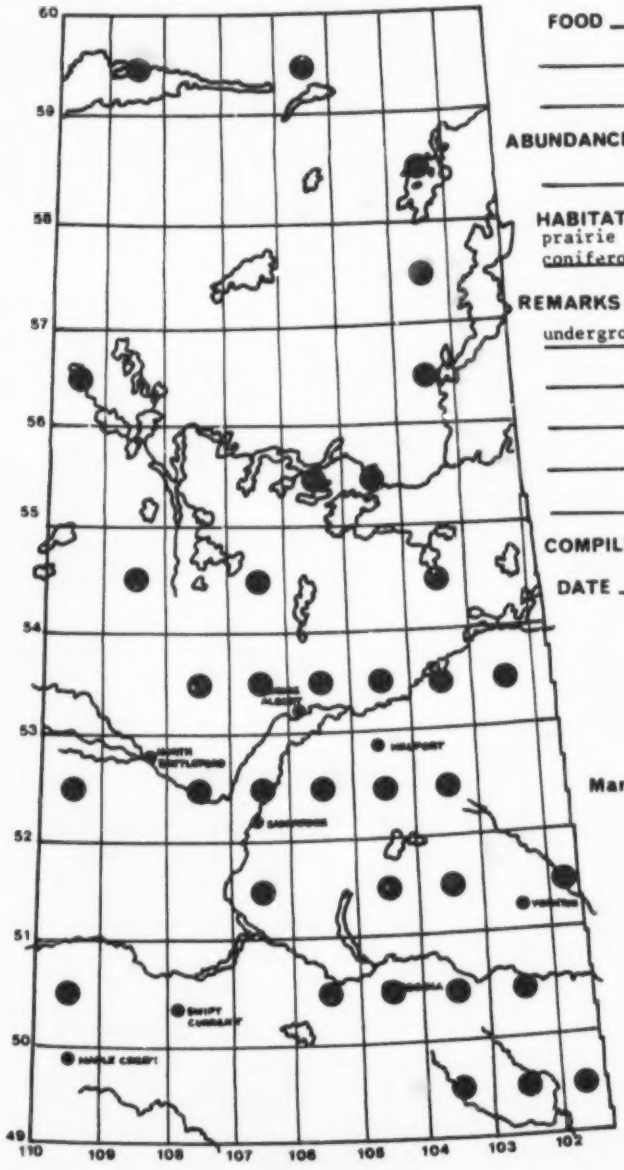
COMPILER P. Curry

DATE October, 1982

SPECIES *Bombus terricola* Kirby

COMMON NAME

SYNONOMY



FOOD

ABUNDANCE Common

HABITAT Widespread from prairie to northern coniferous forest

REMARKS Nests underground

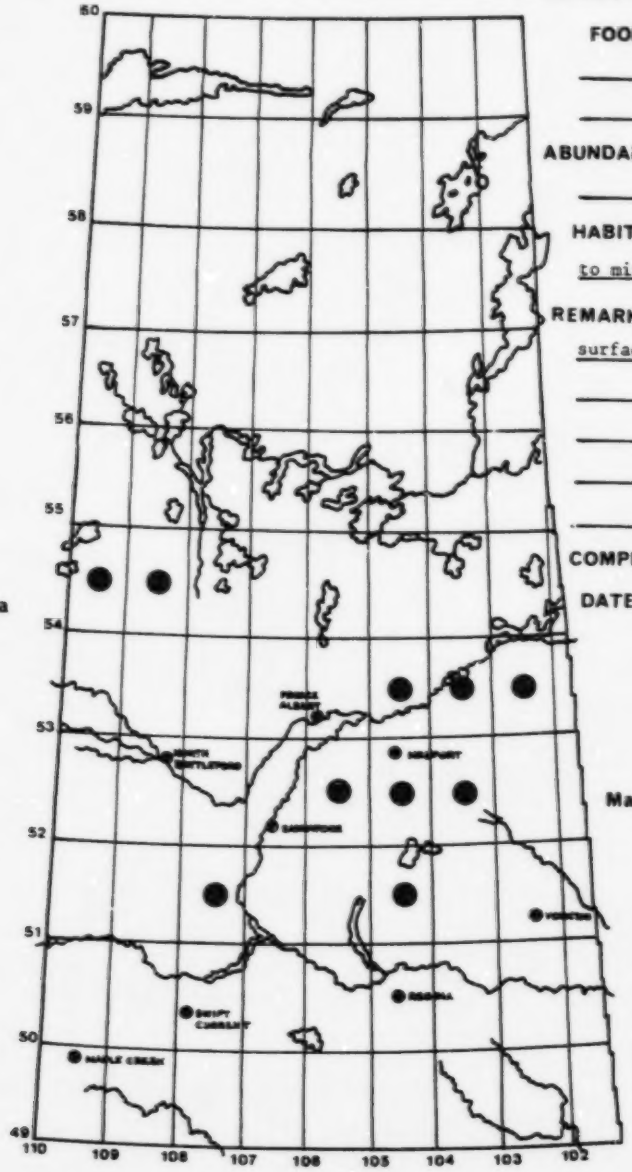
COMPILER P. Curry

DATE October, 1982

SPECIES *Bombus vagans* Smith

COMMON NAME

SYNONOMY



FOOD

ABUNDANCE Occasional

HABITAT Mixed prairie to mixed-wood forest

REMARKS Nests on ground surface or underground

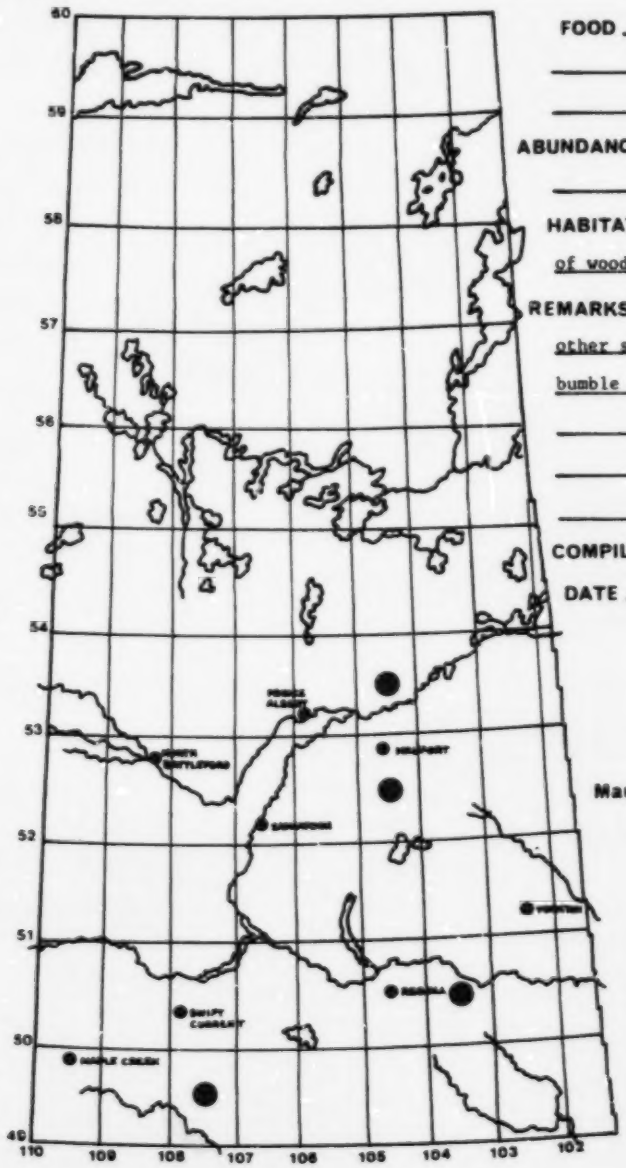
COMPILER P. Curry

DATE October, 1982

SPECIES *Peithyrus ashtoni* Cresson

COMMON NAME _____

SYNONOMY _____



FOOD _____

ABUNDANCE Occasional

HABITAT Eastern portions of woodland and prairies

REMARKS Parasitic on other species of bumble bees

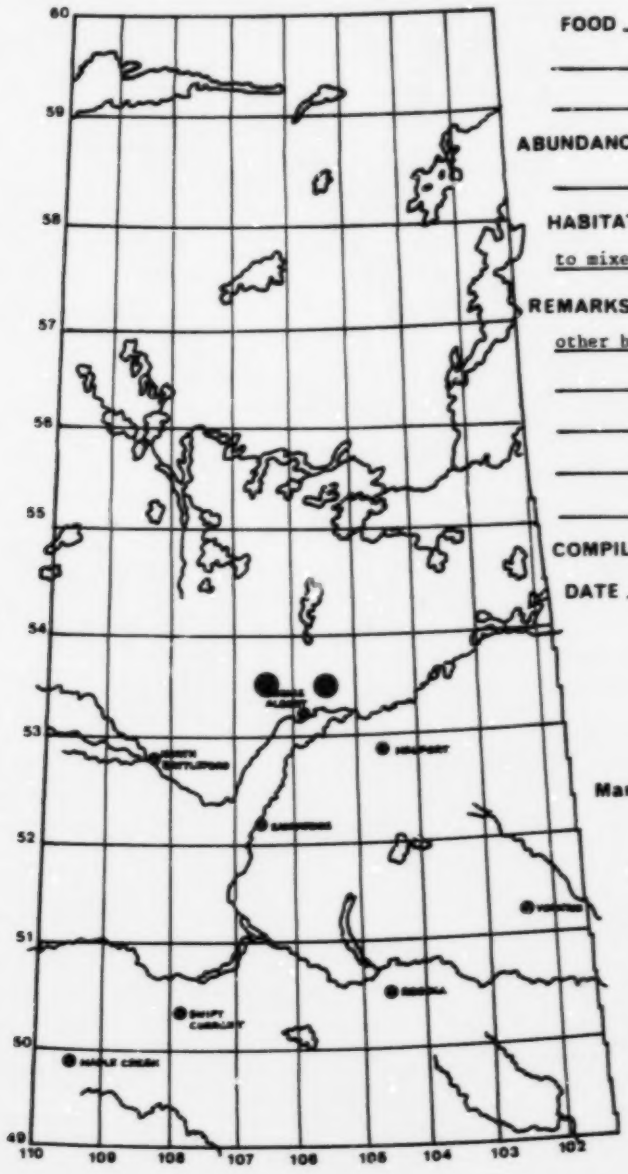
COMPILER P. Curry

DATE October, 1982

SPECIES *Psithyrus fernaldae* Franklin

COMMON NAME

SYNONOMY



FOOD

ABUNDANCE Rare

HABITAT Mixed prairie to mixed wood forest

REMARKS Parasitic on other bumble bees

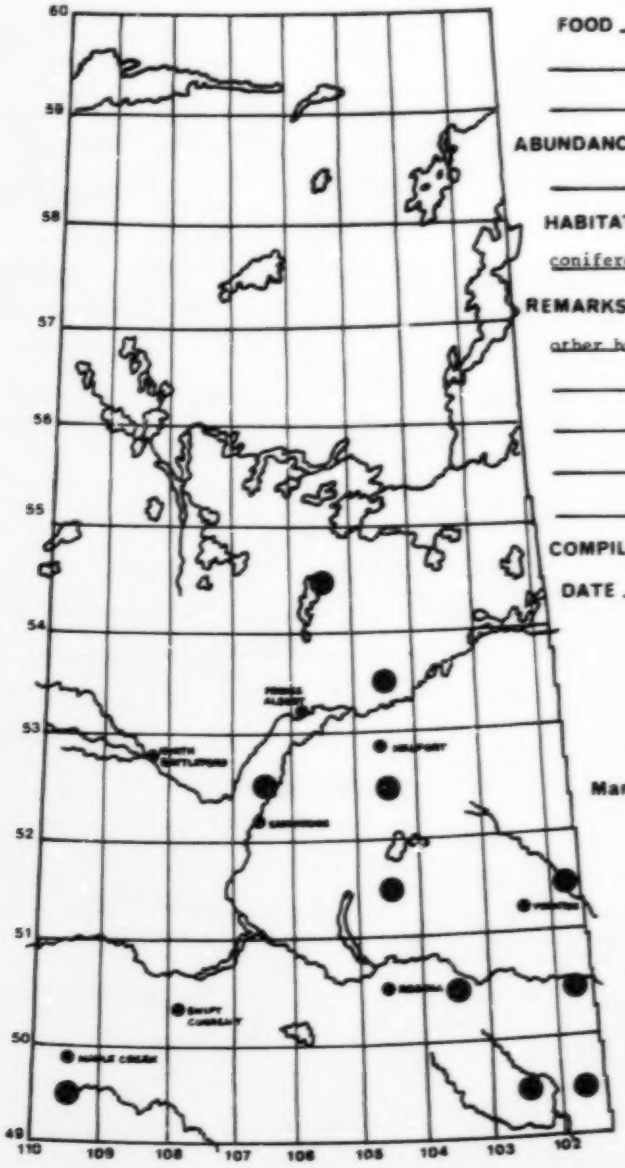
COMPILER P. Curry

DATE October, 1982

SPECIES *Psithyrus insularis* Smith

COMMON NAME

SYNONOMY



FOOD

ABUNDANCE Common

HABITAT Prairie to coniferous forest.

REMARKS Parasitic on orher humble bees

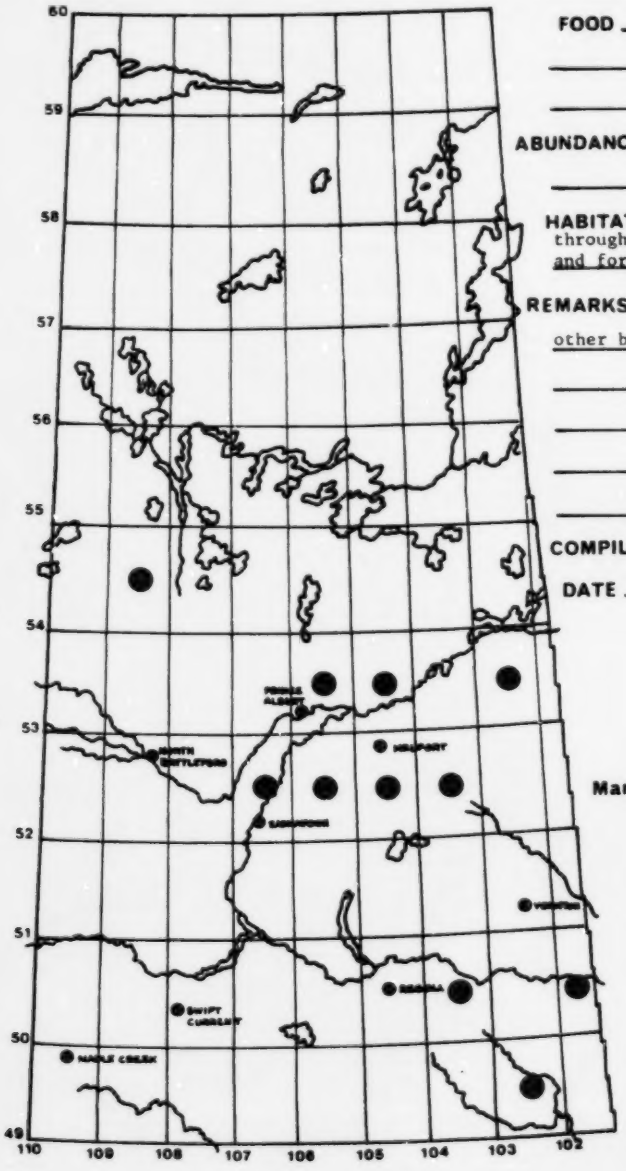
COMPILER P. Curry

DATE October, 1982

SPECIES *Psithyrus suckleyi* Greene

COMMON NAME

SYNONOMY



FOOD

ABUNDANCE Common

HABITAT Widespread throughout grassland and forest areas

REMARKS Parasitic on other bumble bees

COMPILER P. Curry

DATE October, 1982

APPENDIX B. LOCATION RECORDS FOR *BOMBUS* AND *PSITHYRUS* SPECIES IN SASKATCHEWAN

Bombus appositus Cresson--Stockholm, Cypress Hills.

Bombus bifarius Cresson--Redvers

Bombus borealis Kirby--Whitefox, Lorlie, Elbow, Indian Head, Melfort, Nipawin, Aylsham, Saskatoon, Garrick, Outlook, Estevan, Regina, Carlyle, Wallwort, Cypress Hills, Norquay, Fort Qu'Appelle, Tuxford, M. Street Sanctuary (E. of Nipawin), Meskanaw, Crooked R., Pasquia Hills.

Bombus californicus Smith--Whitefox, Melfort, Torch R., Hudson Bay, Crest, Cypress Hills, Humboldt, Snowden, Wallwort, Pasquia Hills, McKague.

Bombus centralis Cresson--Tunstall.

Bombus fervidus Fabricius--Elbow, Eastend, Regina, Saskatoon, Indian Head, Katepwa, Scott, Minton, Perdue, Rock Glen, St. Victor, Swift Current, Tompkins, Val Marie, Tunstall, Wallwort.

Bombus frigidus Smith--Snowden, Prince Albert, Madge Lake, Northside, Big River, Saskatoon, Black Lake, Charcoal Lake, S. Shore Lake Athabasca (near Cantara Lake), Stony Rapids, Pelican Narrows, McLennan Lake, Umpherville R., Otter Rapids.

Bombus huntii Greene--Saskatoon, Indian Head, Outlook, Elbow, Whitefox, Rosetown, Tunstall, Alsask, Weyburn, Kenosee, Val Marie, Rosefield, Tompkins, Avonlea, Portreeve, Goodspirit Lake.

Bombus melanopygus Nylander--S. Shore Lake Athabasca (near Cantara Lake), Milliken Lake, Uranium City.

Bombus mixtus Cresson--Charcoal Lake, Pelican Narrows.

Bombus nevadensis Cresson--Leader, Elbow, Mortlach, Beaver Creek, Saskatoon, Melfort, Nipawin, Pasquia Hills, Val Marie, Carlyle, Tompkins, Killdeer, Fort Qu'Appelle, Mistatim, Yellow Creek.

Bombus occidentalis Greene--Assiniboia, Cypress Hills, Val Marie, Willow Bunch, Wood Mtn.

Bombus perplexus Cresson--Whitefox, Melfort, Nipawin, Aylsham, Pasquia Hills, Hudson Bay, Madge Lake, Northside, Gronlid, Wallwort, Meadow Lake, Saskatoon, Meskanaw, Crooked River.

Bombus rufocinctus Cresson--Tunstall, Torch River, Redvers, Rosetown, Assiniboia, Cypress Hills, Estevan, Laura, Outlook, Alsask, Saskatoon, Whitefox, Melfort, Nipawin, Aylsham, Pasquia Hills, Weyburn, Indian Head, Rosthern, Torquay, Great Deer, Pickthall, Rock Glen, Val Marie, Tompkins, Gainsborough, Wallwort, Dubuc, Dundurn, Meskanaw, Elbow, Yellow Creek, Crooked River, Swift Current.

Bombus ternarius Say--Whitefox, Melfort, Saskatoon, Fort-à-la-Corne Reserve, Regina, Naicam, Stenen, Wroxton, Lady Lake, Silton, Indian Head, Garrick, Humboldt, Weyburn, Tompkins, Amazon, Vawn, Wilkie, Turtleford, Pathlow, Killdeer, Sask. Landing, Wallwort, Pike Lake, Spy Hill, Swan Plain, Good Spirit Lake, Flotten Lake, Battlefords Provincial Park, Tuxford, Pasquia Hills, Meath Park, Waseca.

Bombus terricola Kirby--Neilburg, Candle Lake, Prince Albert, Prince Albert National Park, Christopher Lake, Whitefox, Saskatoon, Lorlie, Krydor, Kenosee Lake, Indian Head, Weyburn, Melfort, Fort-à-la-Corne, Crean Lake, Nipawin, Madge Lake, Regina Beach, Pathlow, Pike Lake, Maryfield, Craven, Wallwort, Punnichy, Tulabi Lake, Stony Rapids, La Loche, Milliken Lake, Portreeve, Eldorado, Flotten Lake, Wadena, Pasquia Hills, Southend, La Ronge, Umpherville River, Geikie River, McLennan Lake, Crooked River, Meskanaw, Aylsham, Big River, Findlater, Whitewood.

Bombus vagans Smith--Whitefox, Melfort, Nipawin, Aylsham, Pasquia Hills, Outlook, Punnichy, Wallwort, Meadow Lake, Pierce Lake, McKague, Yellow Creek.

Psithyrus ashtoni Cresson--Indian Head, Whitefox, Crest, Melfort, Val Marie.

Psithyrus fernaldae Franklin--Emma Lake, Prince Albert, Northside, Shellbrook.

Psithyrus insularis Smith--Whitefox, Saskatoon, Melfort, Kenosee Lake, Umpherville River, S. end of Lac La Ronge, Maryfield, Coté, Cypress Hills, Indian Head, Punnichy, Wallwort, Hazel Cliffe, Moose Mountain.
Psithyrus suckleyi Greene--Whitefox, Melfort, Saskatoon, Indian Head, Prince Albert, Crest, Tobin Lake, Northside, Humboldt, Love, Kenosee Lake, Tantallon, Meadow Lake, McKague, Pasquia Hills.

APPENDIX C. GLOSSARY

Antennae--the sensory feelers or appendages located on the face.
Basitarsus--basal segment of the tarsus (includes the last five segments of the leg).
Clypeus--the plate on the face which lies below the antennae and between the compound eyes.
Compound eyes--the two large eyes composed of many minute lenses.
Corbicular fringe--the fringe of hairs which form the pollen basket, used for carrying pollen. Located on the flattened outer surfaces of the hind tibiae and basal tarsal segment.
Coxa--the first segment of the leg.
Femur--the third segment of the leg.
Interalar--between the bases of the wings.
Malar space--space between the mandible and the lower end of the compound eye.
Mesonotum--the dorsal (uppermost) plates of the thorax (includes the scutum and scutellum).
Ocellus--one of three, small, single-lensed eyes located near the top (vertex) of the head between the apices of the compound eyes.
Pile--refers to the thick-set hair of any particular part of the bumble bee.
Pleura--plates on the side of the thorax.
Tarsus--the last five leg segments taken together.
Tergum--a dorsal (or uppermost) plate of the abdomen.
Tibia--the fourth segment of the leg.
Vertex--the upper part of the head lying between the apices of the compound eyes and from the ocelli to the upper margin of the head.